by joseph e. muscolino, DC | photography by yanik chauvin

stretch your way to better health

There is probably one thing that most everyone agrees upon: stretching is healthy. However, there is a great deal of disagreement about the best method of stretching and when stretching should be done. There are so many possible choices: do we do static or dynamic stretching? Do we use the technique of contract relax or agonist contract? Do we hold the stretch for 10 seconds and do three repetitions (reps), or do we hold it for three seconds and do 10 reps? Do we stretch before or after we exercise?

Let's first look at the fundamentals of stretching by examining the types of stretching techniques that exist and then examining when stretching should be done.

10 tips for stretching:
www.pamf.org/workhealth/stretchtips.html

For more stretching tips, go to **www.stretchingusa.com.**

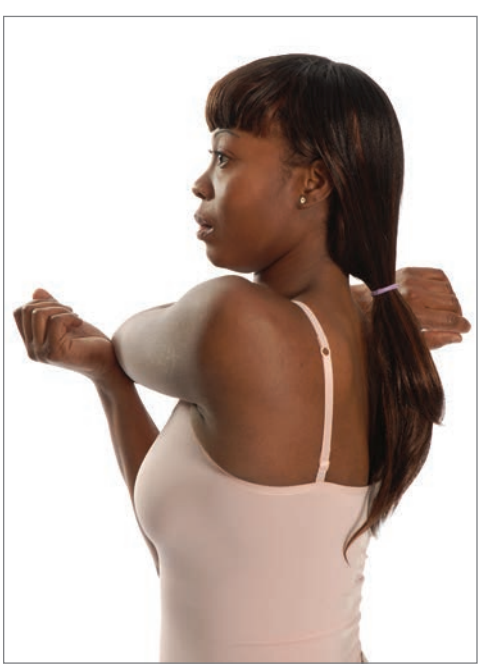


Figure 1 illustrates static stretching in which the person is statically holding a position of stretch of the posterior shoulder muscles.

What is stretching and why is it done?

Simply defined, stretching is a method of physical bodywork that lengthens and elongates soft tissues. These soft tissues may be myofascial units (muscles and their tendons), ligaments and/or joint capsules.

Stretching is done because soft tissues may become shortened and contracted, and have greater tension. This causes the soft tissues to resist lengthening and limits joint mobility and range of motion. Two types of tissue tension exist: passive tension and active tension. All soft tissues can exhibit increased passive tension, which results from increased fascial adhesions that build up in soft tissues over time. Additionally, muscles may exhibit increased active tension, which results when a muscle's contractile elements (actin and myosin filaments) contract via the sliding filament mechanism, creating a pulling force toward the center of the muscle. Whether a soft tissue has increased passive or active tension, this increased tension results in the tissue being more resistant to lengthening. Therefore, stretching is done to lengthen and elongate these tissues, hopefully restoring full range of motion and flexibility of the body. When performing a stretch upon our clients, we use the term "target tissue" to describe the tissue that we intend to stretch, or "target muscle" when we are specifically looking to stretch a muscle or muscle group.

Classic stretching

Ten to twenty years ago, conventional wisdom dictated that stretching should be done before exercise and that the method to employ was what is now called static stretching, meaning that the position of the stretch was attained and then held statically (Figure 1). The length of time recommended to statically hold the stretch was between 10 to 30 seconds; three reps were usually done. Recently, the wisdom of this "classic" stretching technique has been questioned. Further, even the idea of when to statically stretch has been questioned.

When to statically stretch?

The conventional wisdom of when to stretch has recently been turned upside down. For years, it was stated that static stretching should be done before strengthening exercises were done. The reasoning was that stretching would make the tissue more flexible, thereby reducing the risk of tearing these soft tissues during the exercise (i.e., sprains and strains). However, many sources now say that static stretching before strengthening exercise is ineffective because the body is not warmed up. Because the soft tissues of the body are cold, they do not accept the stretching, and little is actually accomplished. In fact, some sources state that static stretching done before strengthening exercise is actually deleterious to the exercise regimen. Their reasoning is that by stretching, musculature is inhibited from contracting and consequently less able to contract quickly when needed to protect a joint from a possible sprain or strain during strenuous exercise.

This does not mean that all stretching is contraindicated before a workout. Mobilization, or dynamic stretching, is now recommended in place of static stretching. Dynamic stretching is done by moving the joints of the body through the ranges of motion that will be asked of them during the exercise workout, and it begins with small ranges of motion with little or no resistance and gradually builds up to full ranges of motion with the resistance of the exercise added. For example, before playing tennis, you would go

through the motions of forehand, backhand and serving strokes without a racquet in hand, beginning with small swings and building up to full swings. Then the same order of motions would be done with a racquet in hand, but not actually hitting a ball. Finally, you actually play on the court, hitting a tennis ball, starting with gentle swings and gradually building up to full and powerful swings (Figure 2). The advantage of this method of exercise warm-up is that circulation is increased, the tissues are warmed up and joints are brought through their ranges of motion. Also, with each motion that is done, soft tissues located on the other side of the joint are dynamically stretched.

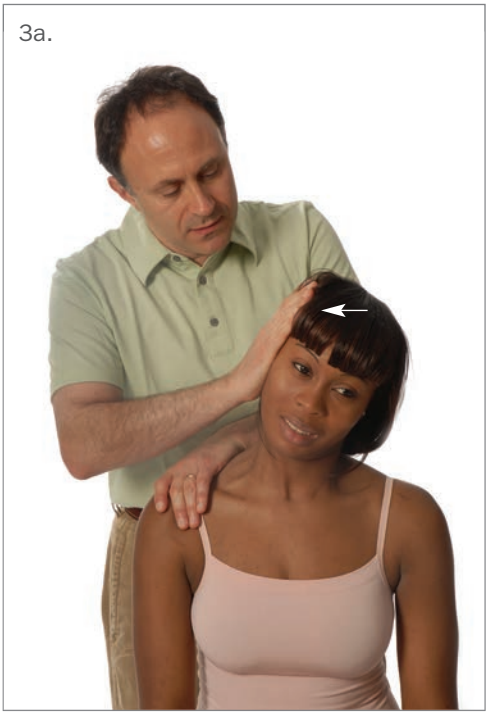
There still is a place for classic static stretching after the strengthening exercises are done and the tissues are warmed up and ready to receive the stretching.

Static or dynamic stretching?

Perhaps the first choice is whether we do classic static stretching or dynamic stretching. More and more sources are recommending that stretching be done in more of a movement-oriented dynamic manner. But, even if we do choose to do static stretching, the rule on how long to hold the position of the stretch once it is achieved has been changing. Whereas it was classically recommended to hold the stretch for 10 to 30 seconds, many sources now advocate that the stretch be held for only 2 to 3 seconds. This allows for approximately 10 reps to be done instead of the previously recommended three. Something interesting to note here is that as the method of static stretching is changed from a long, statically held stretch to one that is a shorter with more repetitions, static stretching increasingly resembles dynamic stretching.

Figure 2 illustrates some of the beginning stages of dynamic stretching for a forehand stroke in tennis. In 2a, a short forehand swing is done without a racquet; in 2b, a larger swing is done without the racquet. The person then progresses to holding a racquet to provide greater resistance, first with a short swing as seen in 2c and then with a larger swing as seen in 2d. After this, the person is ready to progress to the added resistance of actually playing tennis and hitting the ball. Note that with dynamic stretching, when the arm is brought posteriorly for the backswing, the muscles in front of the shoulder joint are stretched. When the person swings forward with the forehand stroke, the muscles in back of the shoulder joint are stretched.

3a.



3b.

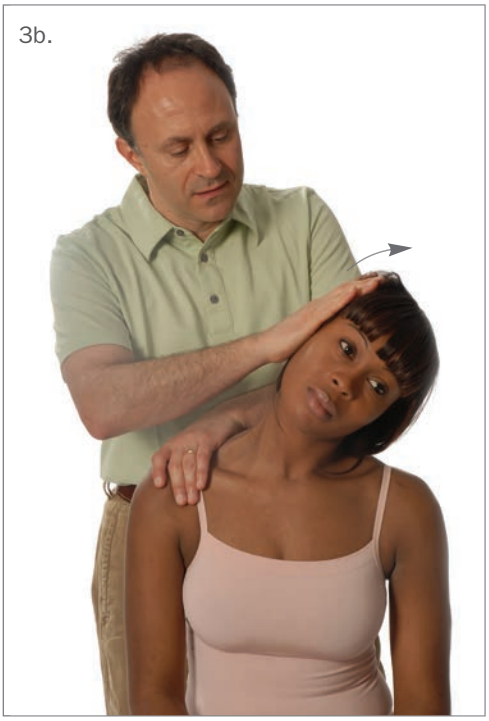


Figure 3 demonstrates CR stretching of the right lateral flexor musculature of the neck. In 3a, the client is isometrically contracting the right lateral flexor musculature against resistance provided by the therapist. In 3b, the therapist is now stretching the right lateral flexor musculature by moving the client's neck into left lateral flexion. This procedure is usually repeated three times.

Beyond the choice of static or dynamic stretching, there is another option: performing the stretch in such a manner that the stretch is facilitated by engaging a neurologic reflex. There are two different stretching techniques that employ a neurologic reflex to help the stretch, contract relax (CR) stretching and agonist contract (AC) stretching.

Stretching facilitated by neurologic reflexes

Contract relax (CR) stretching is perhaps better known as proprioceptive neuromuscular facilitation stretching; it is also known as post-isometric relaxation stretching.*

CR stretching is done by first having your client isometrically contract the target muscle with moderate force against resistance provided by the therapist, then stretch it by lengthening it immediately afterward. The isometric contraction is held for approximately 5 to 8 seconds; this procedure is usually repeated three times. Generally, you should have your client hold in his or her breath while isometrically contracting against resistance. Then have the client exhale and relax while the target muscle is being stretched. The muscle group that is usually used to demonstrate CR stretching is the hamstring group; however this method of stretching can be used for any muscle of the body (Figure 3).

The basis for CR stretching is the Golgi tendon organ (GTO) reflex. It works as follows: If the target muscle is forcefully contracted, the GTO reflex is engaged and results in inhibition of the target muscle (i.e., the muscle is inhibited or stopped from contracted). This is a protective reflex that prevents the forceful contraction from tearing the muscle and/or its tendon. As therapists, we can use this protective reflex to facilitate stretching our client's musculature.

Agonist contract (AC) stretching** also utilizes a neurologic reflex to "facilitate" the stretch of the target muscle; however, instead of the GTO reflex, AC stretching uses reciprocal inhibition (AC stretching that utilizes the neurologic reflex of reciprocal inhibition is the basis for Aaron Mattes' Active Isolated Stretching [AIS] technique). Reciprocal inhibition is a neurologic reflex that acts to prevent two muscles that have antagonistic actions from contracting at the same time. For example, if the brachialis contracts to create flexion of the forearm at the elbow joint, reciprocal inhibition would inhibit the triceps brachii from contracting and creating a force of elbow joint extension (that would oppose the action of elbow joint flexion by the brachialis). In this manner, joint actions can occur more efficiently.

To utilize reciprocal inhibition when stretching a client, have the client do a joint action that is antagonistic to the joint action of the target muscle. This will cause the target muscle to be inhibited, allowing for a greater stretch to be done at the end of this active movement (Figure 4). Generally, the position of stretch is only held for 1 to 3 seconds; this procedure is repeated approximately 10 times. The client is usually asked to breathe in before the movement, and then exhale during the movement.

The two methods of CR and AC stretching can be powerful additions to your repertoire of stretching techniques and may be of great benefit to your clients. In fact, these two methods may both be performed on the client, sequentially doing one after the other. This can create an even greater stretch for the client's target muscle. When these two methods are done in a

sequential manner, CR stretching is usually done first, followed by AC stretching. This protocol is called CRAC stretching.

Clearly there are many choices when it comes to stretching our clients. While current research seems to be leading us away from static stretching and toward dynamic stretching, ultimately you must decide upon the best method to use for each of your clients. Beyond the choice of static/dynamic stretching, if you have not yet worked with CR or AC stretching, I strongly recommend that you begin to add these techniques to your practice. They can be powerful therapeutic tools when standard static and dynamic stretching techniques are not sufficiently effective. ■

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* The name *contract relax* is used because the target muscle is first *contracted*, and then it is *relaxed*. The name *proprioceptive neuromuscular facilitation* is used because a *proprioceptive neurologic* reflex (a GTO reflex) is used to *facilitate* the stretch of the target muscle. The name *post-isometric relaxation* is used because after (i.e., post) an *isometric* contraction, the target muscle is *relaxed* (due to the GTO reflex). In each case, the name describes how the stretch is done.

** The name *agonist contract* is used because the *agonist* (mover) of a joint action is *contracted*, causing the antagonist (our target muscle that we want to stretch) on the other side of the joint to be relaxed (by reciprocal inhibition).

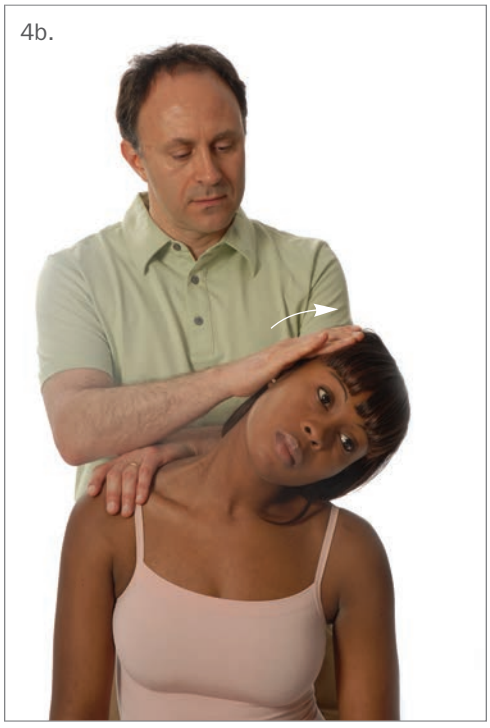

Figure 4 demonstrates AC stretching for the right lateral flexor musculature of the neck. 4a shows the client actively performing left lateral flexion of the neck, which results in a reciprocal inhibition of the right lateral flexor musculature. 4b shows that at the end of range of motion of left lateral flexion, the therapist then stretches the client's neck further into left lateral flexion, thereby stretching the right lateral flexor musculature of the neck. This procedure is usually repeated 8 to 10 times.